

DATA ACQUISITION FROM EUROPEAN POWER PLANTS – EXPERIENCES FROM THE RECPP PROJECT

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RECPP – GENERAL INFORMATION



- ✓ Financing: RFCS - 01 - 2019
- ✓ Project type: AM
- ✓ Realization period:
July 1, 2020 - June 30, 2022
- ✓ Budget: 1,342,072.2 €
- ✓ Funding level: 100%



THE PROJECT COVERS

✓
80000
—
EMPLOYEES

✓
6
—
COUNTRIES

✓
67
—
COVERED PERCENTAGE OF
PRODUCED ENERGY FROM COAL
IN EUROPE

✓
835
—
POWER PLANTS

RECPP – Project consortium



1	✓	VGB	VGB POWERTECH EV	CO	DE
2	✓	GIG	GLOWNY INSTYTUT GORNICTWA	BEN	PL
3	✓	CERTH	ETHNIKO KENTRO EREVNAS KAI TECHNOLOGIKIS ANAPTYXIS	BEN	EL
4	✓	CEZ AS	CEZ AS	BEN	CZ
5	✓	LEAG	LAUSITZ ENERGIE KRAFTWERKE AG	BEN	DE
6	✓	TGPE	TOWARZYSTWO GOSPODARCZE POLSKIE ELEKTROWNIE	BEN	PL
7	✓	TAURON	TAURON WYTWARZANIE SPOLKA AKCYJNA	BEN	PL
8	✓	VTP	VERBUND THERMAL POWER GMBH AND CO KG	BEN	AT
9	✓	RWE	RWE POWER AG	BEN	DE
10	✓	Uniper SE	UNIPER SE	BEN	DE
11	✓	RWE GENER	RWE GENERATION SE	BEN	DE
12	✓	EDF	ELECTRICITE DE FRANCE	BEN	FR
13	✓	MUL	MONTANUNIVERSITAET LEOBEN	BEN	AT



PURPOSE AND SCOPE OF THE PROJECT

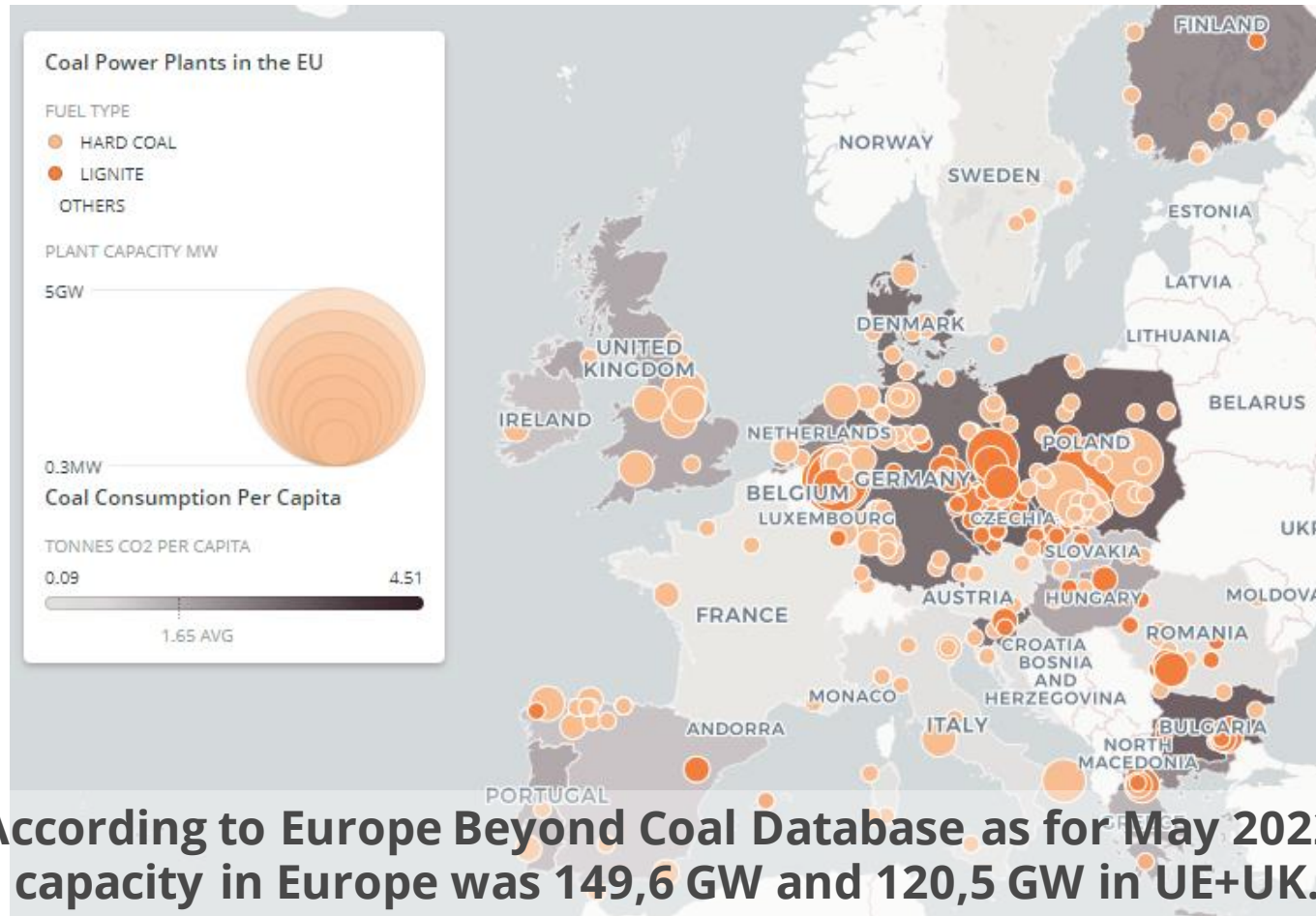


The general objective of RECPP project was to examine the challenges and opportunities related to the re-purposing potential of the coal-power plants and their infrastructure.

Based on the **mapping**, screening, and scenario-building RECPP will facilitate an informed, productive discussion between the sites owners and the communities and will provide the European Union members, power plants owners and the local community with feasible reuse options and regions development.

RECPP will complement the activities undertaken under Coal Regions in Transition. RECPP aims to make an inventory of coal power plants in Europe and an indication of the possibilities of their successful reuse.

WHAT IS THE POTENTIAL FOR REPURPOSING OF COAL-FIRED POWER PLANTS ASSETS?



According to Europe Beyond Coal Database as for May 2022, capacity in Europe was 149,6 GW and 120,5 GW in UE+UK.

COAL-FIRED POWER PLANTS IN THE EU - BASIC

DATA AS OF 15 JUL 2022

			Under construction	Operating				Retired or fuel switch	
			Total	Total	Lignite	Hard coal	Open but announced to retire	Since 1 2016	Since 1 2005
Capacity	Europe	MW	2 682	150 385	66 642	83 743	75 226	57 217	98 332
	EU+UK	MW	769	121 068	46 780	74 288	75 226	57 217	98 110
Plants	Europe	No.	4	248	101	147	108	76	139
	EU+UK	No.	2	203	67	136	108	76	139
Units	Europe	No.	7	619	297	322	235	187	421
	EU+UK	No.	2	511	209	302	235	187	418

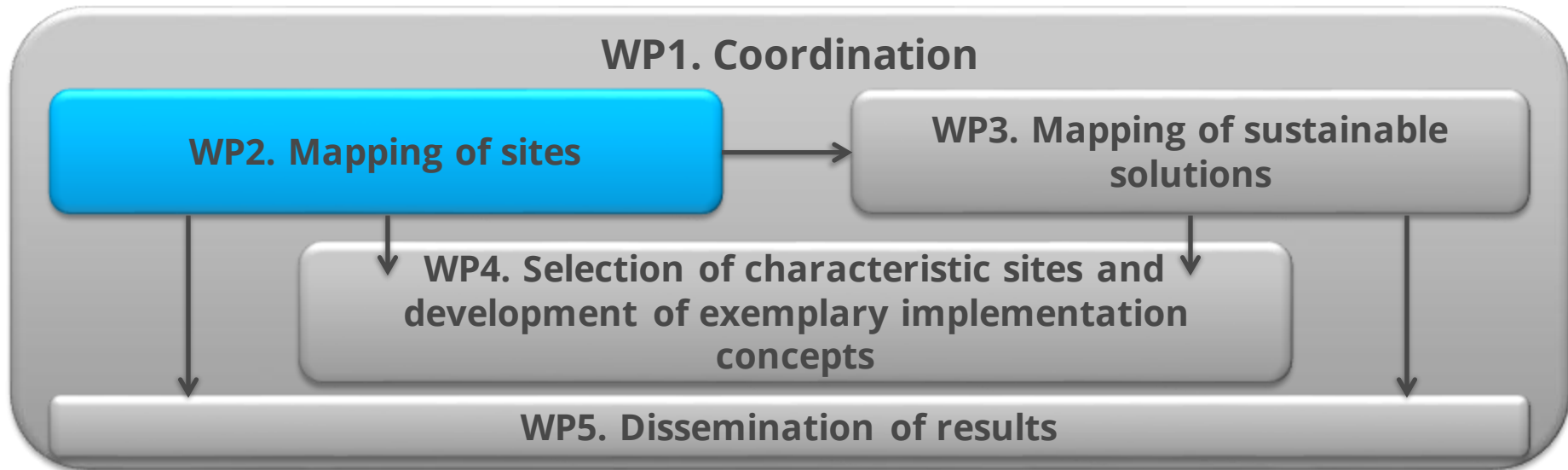
By international comparison, the EU has a significantly lower emissions intensity of power generation than other large economies. The carbon intensity was 241 grammes of CO₂ per kilowatt-hour (gCO₂/kWh) in 2021, compared with 348 gCO₂/kWh in the United States, around 550 gCO₂/kWh in the People's Republic of China and over 630 gCO₂/kWh in India and 527 gCO₂/KWh in Australia.

Source: IEA, EMBER

2021	
CO ₂ emissions (EU)	388 Mt CO ₂
- lignite	215 Mt CO ₂
- hard coal	172 Mt CO ₂

SOURCE: [Database - Europe Beyond Coal](https://www.beyond-coal.eu/) : [Europe Beyond Coal \(beyond-coal.eu\)](https://www.beyond-coal.eu/)

THE MAIN TASKS OF THE PROJECT



Mapping of the sites - specific objectives:

- ✓ Determination of the method and tools for gathering and systematizing the data collected for different regions.
- ✓ Collection and systematization of data based on a set of preconditions for sustainable use of assets of coal power stations in the process of phasing out for further investigation of the best sustainable approach for re-purposing of their infrastructures.
- ✓ Data gathering for identification of the adequate boundaries of the different exemplary implementation concepts based on existing spatial connectivity and functional cohesion for each coal power plant and its infrastructure suitable for re-purposing.
- ✓ Specification of legal conditions for sustainable use of assets of coal power stations in the process of phasing out.

HOW TO GET AND COLLECT DATA FOR PROPER MAPPING OF POWER PLANTS AND THEIR ASSETS?

One of the first and very important work packages

MAPPING OF SITES

Best practices and tools
for characterising coal power plants for re-purposing

Gathering key data
for characterising power plants for re-purposing

Mapping the legal boundaries for power plants and their infrastructure decommissioning

MAPPING POWER PLANTS AND THEIR INFRASTRUCTURE



POWER PLANT DATA



- I. POWER PLANT DATA
- II. DESCRIPTION OF THE COAL POWER PLANT UNIT/ UNITS / TECHNOLOGICAL SYSTEM
- III. COMMON INTERNAL INFRASTRUCTURE
- IV. EXTERNAL INFRASTRUCTURE
- V. SURROUNDING INFRASTRUCTURE
- VI. COMMITMENTS
- VII. DIRECTIONS OF FUTURE REPURPOSING - EU FUNDS.

<https://survey.alchemer.eu/s3/90292445/Power-plant-data-RECPP>

RECPP
RE-PURPOSING COAL POWER PLANTS

European Commission

Research Fund for Coal & Steel

Grant Agreement 89512 - RECPP - RFCS-2019

Dear Participant,

We invite you to participate in a research study on the re-purposing potential of coal-fired power plants thus opening perspectives for coal regions in transition beyond the coal phase-out. This study is part of a project Re-Purposing Coal Power Plants During Energy Transition (RECPP) funded by European Funds under the Research Fund for Coal and Steel Programme.

The questionnaire that we are sending to you is a central part of the development of a database on coal-fired power plants in the European Union, and enter also on their infrastructure and development plans, current operation, common assets, and common commitments. This questionnaire will be sent to most power plants in the EU. The data collected in this manner will be aggregated and processed in order to get the overview of the situation in the entire EU coal-fired power sector. The results of the survey, combined with a deeper analysis of the energy sector in the EU, experience in transformation as well as analysis of available technologies, will help to illustrate the challenges and opportunities related to the re-purposing potential of the coal power plants and its infrastructure. The study will complement the activities undertaken under Coal Regions in Transition. The key results expected as an outcome of the study are: an inventory of coal power plants in Europe, and an indication of the possibilities of their successful reuse.

The following questionnaire will require approximately 40 minutes to complete if you have all the necessary information. If there is a need for consultation or collection of data, the execution time may be proportionally extended. Please remember that the survey can be completed in several stages (by option: save and continue later). The survey is completely anonymous and all responses will remain confidential. Data from this research will be used only to prepare collective summaries. The survey completed by you will not be made available to the public in any way. The survey will be submitted to the project team responsible for developing the survey results. Members of this team are obliged to maintain professional secrecy related to the implementation of the research. If you agree to participate in this project, please answer the questions on the questionnaire as best you can. Thank you very much in advance for the time and effort devoted to completing the survey. We are convinced that the knowledge obtained from the survey will help our team in developing a catalogue of good practices and working out the best solutions and justified proposals for the successful reuse of power plants in the EU and appropriate transformation of regions. We also hope that you will find the survey questions interesting. If you require additional information or have questions, please feel free to contact us via email: info@repp.eu, alchemer@repp.eu

Next

Power plant data (RECPP)

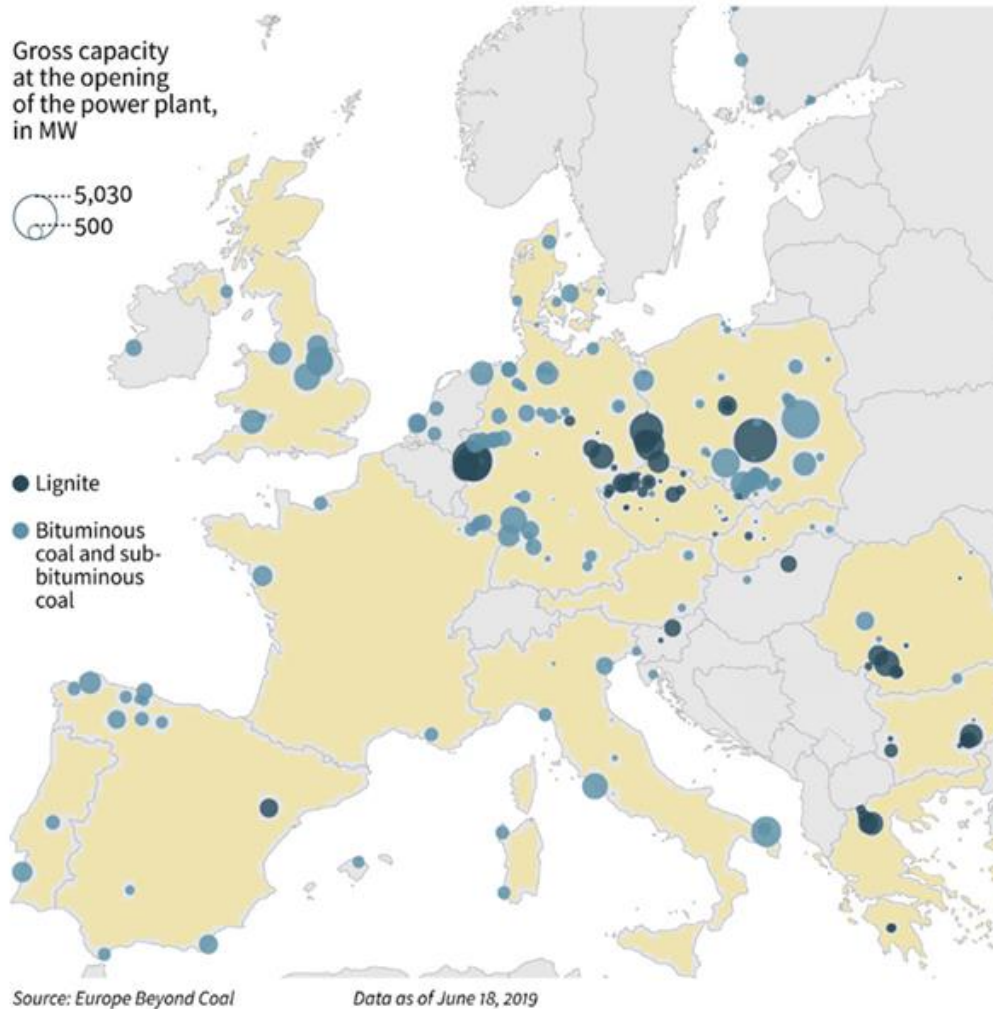
I POWER PLANT DATA

1. Name:

2. Location (address):
(link with google maps pin or geographic coordinates)

3. Power plant area [ha or km2]
(refers to the area of land belonging to the power plant and situated within its fenced area)

MAPPING POWER PLANTS AND THEIR INFRASTRUCTURE

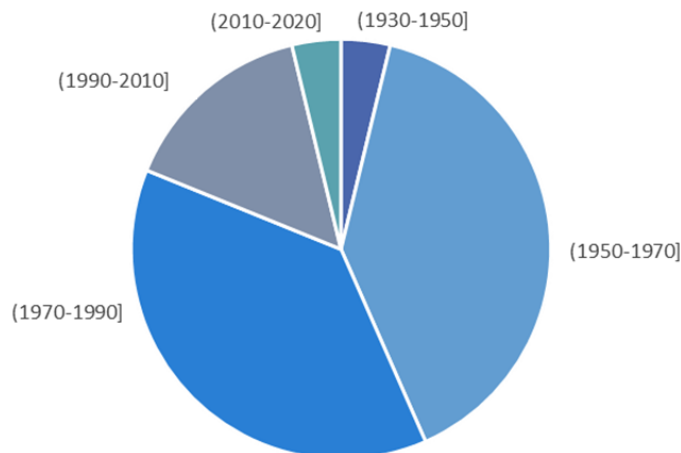


Country / Coded name					
Austria	AT-1	Germany	DE-11	Poland	PL-2
Austria	AT-2	Germany	DE-12	Poland	PL-4
Austria	AT-3	Germany	DE-13	Poland	PL-5
Bulgaria	BG-1	Germany	DE-14	Poland	PL-6
Czech Rep.	CZ-1	Germany	DE-15	Poland	PL-7
Czech Rep.	CZ-2	Germany	DE-16	Poland	PL-8
Czech Rep.	CZ-3	Germany	DE-17	Poland	PL-9
Czech Rep.	CZ-4	Germany	DE-18	Poland	PL-10
Czech Rep.	CZ-5	Germany	DE-19	Poland	PL-11
Czech Rep.	CZ-6	Germany	DE-20	Poland	PL-12
Czech Rep.	CZ-7	Germany	DE-21	Poland	PL-13
Denmark	DK-1	Germany	DE-22	Poland	PL-14
France	FR-4	Germany	DE-23	Poland	PL-15
France	FR-5	Germany	DE-24	Poland	PL-16
France	FR-6	Germany	DE-25	Poland	PL-17
France	FR-7	Germany	DE-26	Poland	PL-18
France	FR-8	Germany	DE-27	Poland	PL-19
France	FR-9	Germany	DE-28	Poland	PL-20
France	FR-10	Germany	DE-29	Poland	PL-21
France	FR-11	Germany	DE-30	Poland	PL-22
France	FR-12	Germany	DE-31	Poland	PL-23
Germany	DE-1	Germany	DE-32	Portugal	PT-1
Germany	DE-2	Greece	GR-1	Romania	RO-1
Germany	DE-3	Greece	GR-2	Romania	RO-2
Germany	DE-4	Greece	GR-3	Slovenia	SI-1
Germany	DE-5	Greece	GR-4	Spain	ES-1
Germany	DE-6	Greece	GR-5	UK	UK-1
Germany	DE-7	Italy	IT-1	UK	UK-2
Germany	DE-8	Italy	IT-2	UK	UK-3
Germany	DE-9	Poland	PL-1	UK	UK-4
Germany	DE-10				

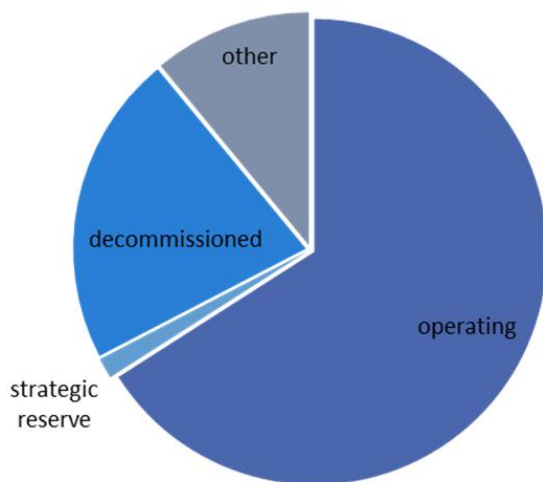
The RECPP has mapped around 80% of the capacity of EU coal-fired power plants.

MAPPING POWER PLANTS AND THEIR INFRASTRUCTURE

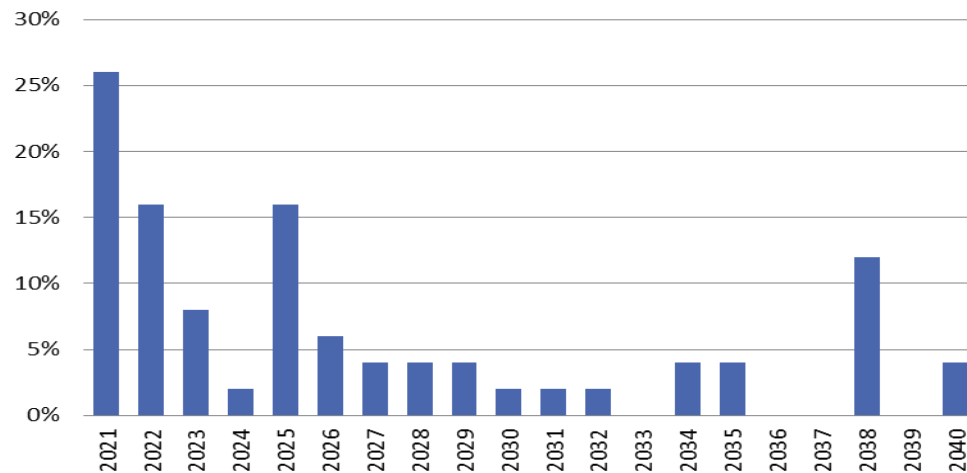
POWER PLANT DATA and DESCRIPTION OF THE COAL POWER PLANT UNITS



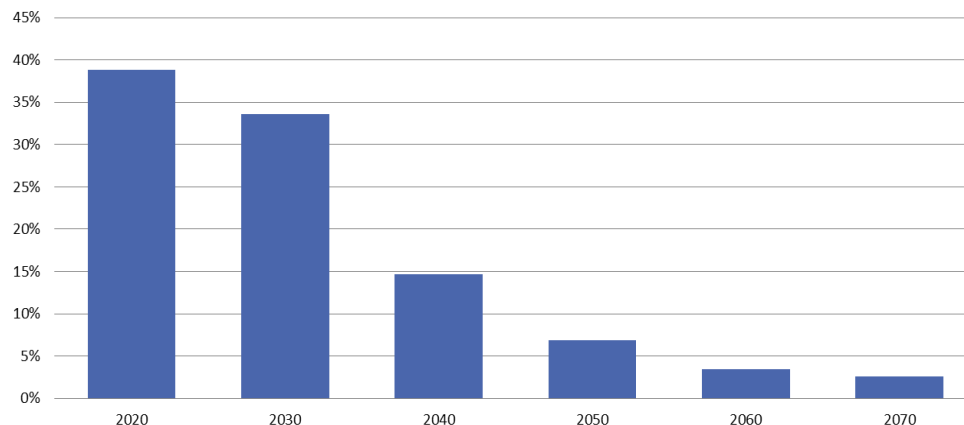
YEAR OF COMMISSIONING



UNIT STATUS



PLANNED DATE OF PERMANENT UNIT DECOMMISSIONING/PHASE-OUT



AN EXPECTED TECHNICAL LIFETIME OF THE UNIT

DATA ACQUISITION CHALLENGES

- I. Preparation of a questionnaire sheet that would be possible to fill in by all recipients (standardized) and simultaneously obtain data specific to a given localization/power plant.
- II. Confidential / sensitive data, requiring the consent of the management board, the need to disclose data indicating the operator
- III. Errors in filling in despite the aforementioned standardization – the data had to be carefully checked. It concerned:
 - ✓ the use of decimal separator (radix character). Likewise, while the U.K. and U.S. use a comma to separate groups of thousands, many other countries use a period instead.
 - ✓ incorrect measurement unit despite the indicated ones

Res. ID	1. Name:	2. Location (address):	3. Power plant area [ha or km2]	4. Operator or/and owner:	Gross power capacity*: Fuel: Lignite (MW)
333	xxx	xxx	xxx	DE-25	2354654
334	xxx	xxx	xxx	DE-26	4464
335	xxx	xxx	xxx	CZ-5	990
337	xxx	xxx	xxx	CZ-7	960
339	xxx	xxx	xxx	DE-27	3964300
340	xxx	xxx	xxx	DE-28	2654213

DATA ACQUISITION CHALLENGES

- IV. data reliability - incl. on the expected shutdown of the power plant: confirmed by the concession data or only the predictions of the respondent.
- V. partially completed forms - some data completed, but are they final and correct data? So should they be taken into account?

Response ID	Status	Coded name
310	Complete	CZ-1
328	Partial	-
331	Complete	CZ-4
128	Complete	DK-1
88	Partial	-

- VI. Language barrier - technical vocabulary, differences in legal regulations - the need to add additional explanations/definitions to some terms in the survey.

6. Power plant concession* expiry:

**A concession means - depending on the country and its legal regulations: a license, permit, registration or other form of consent issued by administrative authorities to carry out energy production and distribution activities, or consent to this activity under applicable law, or notification of activity to an appropriate register kept by administrative authorities.*

12. Cooling water installation type

Once-through systems take water from nearby sources (e.g., rivers, lakes, aquifers, or the ocean), circulate it through pipes to absorb heat from the steam in systems called condensers, and discharge the now warmer water to the local source. Once-through systems were initially the most popular because of their simplicity, low cost, and the possibility of siting power plants

DATA ACQUISITION CHALLENGES

Solution:

DATA VALIDATION PROCEDURE

Weaknesses:

- time consuming
- need of additional staff

Strengths:

- data reliability
- possibility of using partial data

WHAT IS THE CORRECT DATA SOURCE FOR VALIDATION?

Local data:

- company / entity data

Data at the national level:

- The statistical offices
- The ministries
- The energy regulatory office
- Transmission System Operator

EU/International data:

- Eurostat
- IEA
- Others ... ?

**which of the
provided data is
FAIR data?**

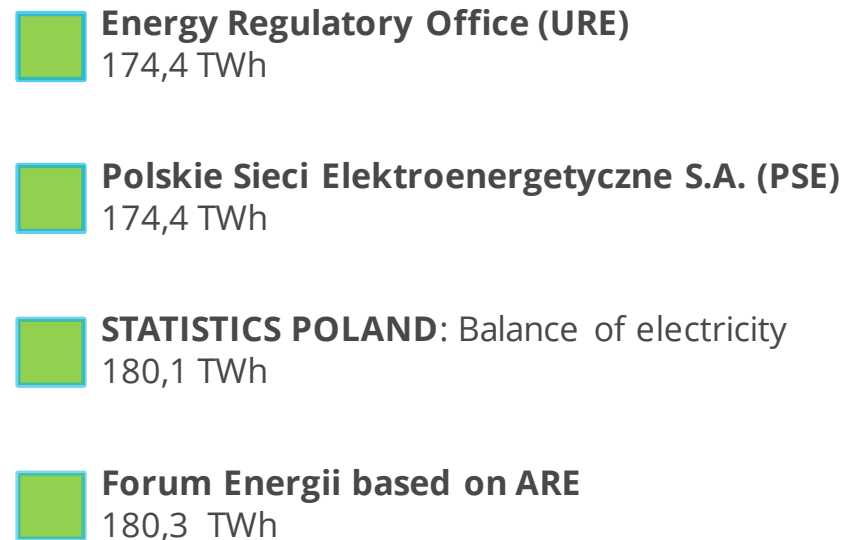
EXAMPLES OF DATA INCONSISTENCY

DATA ON THE POLISH POWER INDUSTRY

Electricity production in 2021



Electricity consumption in 2021



CONCLUSIONS

- ✓ Data collecting processes are very important to gather an accurate database,
- ✓ Well understanding the definition of required data is crucial for right fulfilling the questionnaire,
- ✓ Collected data should be checked (systematic errors) before the automation of their usage,
- ✓ Partial data should be accepted; that is not possible to have access to all data,
- ✓ Experts' opinions help to eliminate structural errors.



Thank you for your attention

